Kenyan doctoral students' success

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KENYAN DOCTORAL STUDENTS' SUCCESS: ROLES OF MOTIVATION AND SELF-EFFICACY

ABSTRACT

Doctor of philosophy (PhD) degree holders are highly regarded in Kenya, especially in academia, and the Kenyan economy needs them to undertake administrative, research and innovation roles in academia and industry. However, attaining this qualification is arduous and Kenyan PhD programmes are characterised by low enrolment numbers, long degree completion times and low graduation rates. In other countries, PhD students' success has been linked to motivation and self-efficacy. This cross-sectional study explores the extents to which motivation and self-efficacy relate to PhD student success in Kenya and to which this relationship differs across background and programme characteristics. Using multiple linear regression, the authors analyse data from an online questionnaire administered to 628 PhD students enrolled between 2010 and 2018. The findings indicate that extrinsic motivation does not predict PhD students' pace. Intrinsic motivation positively predicts students' pace in the Medical Sciences programme cluster and for those aged 51 years or older. Self-efficacy negatively predicts students' pace in the Medical Sciences programme cluster.

Keywords: *doctoral student success, student pace, intrinsic motivation, extrinsic motivation, self-efficacy.*

1. INTRODUCTION

Although attaining a Doctor of Philosophy (PhD) degree is regarded as a huge achievement in Kenya, the number of students enrolled and who graduate are lower than expected. The number of PhD graduates also does not align with the demand for PhD holders, estimated at 2,400 per annum (Government of Kenya, 2012). Kenyan universities instead enrolled 7,146 and 9,577 PhD students in 2015 and 2016, respectively; with a 13% graduation rate reported in Kenya. These numbers yield about half of the PhD graduates required (Commission for University Education [CUE], 2018; Matheka, Jansen & Hofman, 2020).

Yet demand for university education in Kenya has grown rapidly, as evidenced by increases in the aggregate enrolment numbers in bachelors' and masters' programmes. Between 2015 and 2016, student enrolment in bachelors' programmes grew to 478,418 (.6% growth),

that in masters' programmes to 58,221 (5% growth), and that in doctoral programmes to 9,577 (34% increase) (CUE, 2018). In response, the government of Kenya increased the number of universities from 32 in 2011 to 74 in 2017 (CUE, 2017; Sifuna, 2010). However, this increase heightened pressures on available PhD holders, given that it takes at least three years to train a PhD graduate. One reason for persistently low PhD graduation numbers is that efforts to increase PhD training have been minimal and disjointed, yielding poor results (Barasa & Omulando, 2018; Kigotho, 2018). In turn, low PhD graduation rates increase the pressures on available PhD holders to cover administrative, teaching, research and outreach roles. In addition, this situation threatens Kenya's Vision 2030 goal of becoming a middle-class knowledge economy, through the development of high-quality human resources to undertake research and innovation (Government of Kenya, 2007). To break this cycle, researchers and policy makers need to find the key to increasing the number of PhD graduates.

Prior research identifies several contributing factors to PhD students' success, which can be broadly grouped into students' background factors, supervisory and integration factors and programme characteristic variables (Bair & Haworth, 2004; Litalien & Guay, 2015; Tinto, 1993). In terms of students' background characteristics, research has emphasised socioeconomic factors, though individual psychological factors such as self-efficacy, self-regulation and motivation may also be key predictors of educational achievement (Lovitts, 2001; Wao & Onwuegbuzie, 2011). The influence of these factors is more salient in PhD-level programmes, due to their complexity, loose structure and demand for sophisticated outputs, which require long working hours for extended time periods (Litalien, Guay & Morin, 2015). From the literature reviewed, there has been extensive research on PhD success factors including motivation and self-efficacy. However, these studies were undertaken in Western countries. Therefore, this study seeks to clarify how motivation and self-efficacy relates to PhD students' success in universities in a developing country, in this case, Kenya.

1.1 Theoretical framework

Researchers investigating motivation and self-efficacy have sought to explain people's choice of tasks, persistence and actual achievement. For example, expectancy–value theory posits that a person's choices, persistence and achievement can be predicted by subjective task value and expectancies (Wigfied & Eccles, 2000). The subjective task value refers to how important the person perceives the task to be, with four components: *attainment value,* which refers to the importance of doing well in a task based on personal values and schema*; intrinsic value,* which relates to the enjoyment experienced while undertaking the task; *utility value* or how success in a task relates to the achievement of current and/or future goals and *task cost,* which refers to the amount of effort and time required to succeed, lost opportunities and fear of failure. *Expectancies* are individual perceptions of current and future chances of success based on personal beliefs in competencies and abilities (Eccles & Wigfied, 2002; Wigfied & Eccles, 2000).

Although expectancy–value theory was developed to explain adolescents and their achievements, it has been applied to explain persistence, success and even satisfaction at the PhD level (Cheng, Taylor, Williams & Tong, 2016; Zhou, 2014: 178). According to this theory, four components of value influence a PhD student's effort to persist and succeed. PhD students who are intrinsically motivated assign attainment and/or intrinsic value to their PhD trajectory, meaning that they have an innate need to gain knowledge in a field or discipline of study. Earning a PhD is an end in itself, not a means to an end. Extrinsically motivated

students view a PhD as a way to achieve some current or future goals beyond the degree (utility value), such as career advancement, social status or professional mobility (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000; Zhou, 2014). Lastly, the cost of quitting can influence students' persistence, even in the face of severe challenges. These costs could include the finances, effort and time already invested, the opportunities already lost while undertaking the PhD programme, embarrassment to self and family for non-achievement and the fear of disappointing parents and sponsors (Eccles & Wigfield, 2002; Zhou, 2014).

People invest more effort when they expect to achieve a goal. Thus, PhD students who feel confident about their abilities are likely to be more enthusiastic and motivated to expend the required effort. This feeling of confidence is influenced by previous task performance results and experiences, self-schema and other socialisation factors such as culture and gender roles (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000; Zhou, 2014).

Doctoral studies involve extensive work executed independently for long periods of time. This isolation can expose students to enormous stress, which might result in self-doubt and reduced motivation. Intrinsic motivation tends to be more sustainable in promoting persistence and achievement, though Zhou (2014) notes that some extrinsic motivators are effective. Similarly, persistence and success require students to believe in their capacity to achieve the standards of the PhD programme (Eccles & Wigfield, 2002). Expectancy–value theory has been applied in studies of special PhD groups and in Western countries (Cheng *et al.*, 2016; Zhou, 2014); this study represents an extension by applying three elements of the theory to explain PhD students' success in a developing country, in this case Kenya. Figure 1 displays the conceptual model.

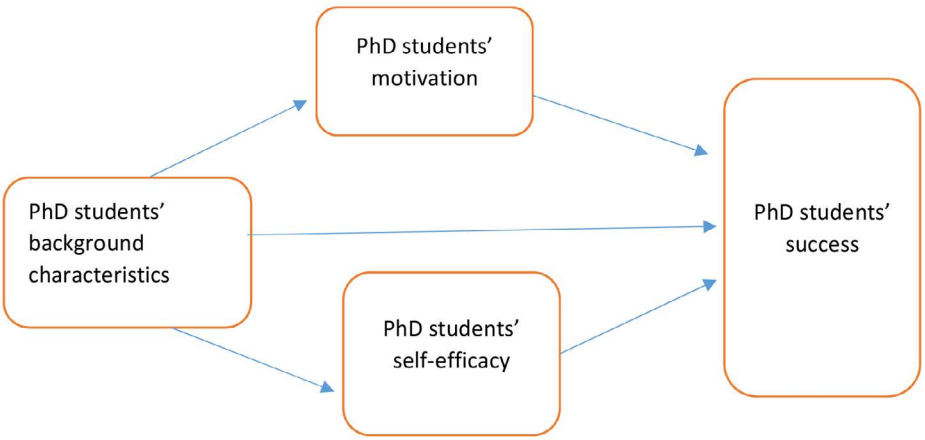

Figure 1: Conceptual model

In this study, we test three components of the expectancy–value model to explain PhD students' success, while controlling PhD students' background characteristics. It involves two motivation dimensions (intrinsic and extrinsic) and students' self-efficacy. Students' intrinsic motivation is influenced by the attainment and intrinsic value they assign to PhD success. Their extrinsic motivation corresponds to the utility value they expect to gain by attaining their

PhD degree. The expectancies of their own abilities and competencies to succeed in their PhD programme relate to the PhD students' self-efficacy.

Background characteristics

Many studies of doctoral education cite background characteristics (e.g., students' age, gender, residential status, employment, family commitments) as important factors (Council of Graduate Schools, 2009; Groenvynck, Vandevelde & Rossem, 2013; Jiranek, 2010; Maher, Ford & Thompson, 2004). Some research reports that age does not predict success (Watthanapradith, Choonpradub, & Lim , 2016: 880; Wright & Cochrane, 2000), whereas other studies indicate that younger PhD students achieve better progression than older ones (Groenvynck *et al.*, 2013; Johnson-Motoyama, Petr & Mitchell, 2014). Research on gender effects similarly offers mixed results: Some scholars report that male PhD students can better persist and feature higher graduation rates (Ferreira, 2003; Groenvynck *et al.*, 2013; Jiranek, 2010), whereas other studies report better progression among female students (Watthanapradith *et al.*, 2016), and still other studies show no gender differences (Johnson-Motoyama *et al.*, 2014; Park, 2005; Thune, Kyvik, Sörlin, Bruen, Vabø & Tømte, 2012; Wright & Cochrane, 2000). International PhD students do better than local students in terms of graduation times and rates, which has been attributed to potential expiration of their visa status and the higher opportunity costs of being away from their home country (Watthanapradith *et al.*, 2016).

Employment status is sometimes related to the availability and adequacy of financial aid and family commitments. For example, PhD students who must work while studying have difficulty finalising their PhD projects (Bair & Haworth, 2004; Ho, Wong & Wong, 2010; Khozaei, Khozaei & Salleh, 2015; Wao & Onwuegbuzie, 2011). Students working outside their university and in jobs unrelated to their PhD research area also progress more slowly than those who work in a research project related to their PhD work (Bair & Haworth, 2004; Herman, 2011; Wao & Onwuegbuzie, 2011). However, another study indicates that PhD students who work full-time progress better than those who work part-time (Gittings et al., 2018). Financial assistance also likely predicts persistence, such that the type, amount and timing influence students' progress (Wao & Onwuegbuzie, 2011). When PhD students experience a major life event, they are more likely to delay or drop out of a programme (Schoot, Yerkes, Mouw & Sonneveld, 2013).

Motivation

Motivation refers to the reason people undertake the things they do, the process of eliciting behaviours that achieve certain objectives or a set of factors that influence behaviour or decisions (Deci & Ryan, 2000; Eccles and Wigfield 2002; Wiegerová, 2016, Zhou, 2015). Deci and Ryan (2000) theorise that people can be intrinsically or extrinsically motivated. Intrinsic motivation occurs when the person performs a task for the sole purpose of obtaining the satisfaction of accomplishing it, or the fun and enjoyment of the experience. Intrinsically motivated students undertake the PhD programme because they are interested in gaining knowledge in the research area or in teaching. Extrinsic motivation occurs when a task is performed as a means to an end, for reasons other than self-interest (i.e., instrumental purpose; Deci & Ryan, 2000). Extrinsically motivated students might be interested in furthering their teaching or research careers and increasing their job and physical mobility to fit among their peers or gain social status.

Motivation and PhD students' success

To explain choice, persistence and success in PhD studies, scholars have investigated push and pull forces (Brailsford, 2010; Wao & Onwuegbuzie, 2011; Wiegerová, 2016). Motivation is especially important in predicting success in PhD studies, due to their nature. These programmes require PhD students to work independently and autonomously (include little or no coursework) while demanding complex activities and outputs (Litalien *et al.*, 2015). Therefore, motivation and personal drive are key factors in PhD students' success (Kyvik & Olsen, 2014; Wao & Onwuegbuzie, 2011:129; Zhou, 2015). According to Kyvik and Olsen's (2014) investigation of Norwegian doctoral training, improved completion rates stem from extrinsic motivation, due to a new policy that required a PhD qualification for any permanent academic position and as a pathway for any successful researcher. Similarly, Lindsay (2015) reports that PhD students' individual motivation level is a key enabler or hindrance of their thesis completion.

Self-efficacy

The general concept of self-efficacy has been applied in various contexts and situations (Almgren *et al.*, 2016; Litalien & Guay, 2015), operationalised as a self-evaluation of one's own ability or chances in academic environments, perceptions of academic performance efficacy or perceived self-competence. Researchers posit that the degree to which people perceive their own competences for a task may determine the effort they put into that or related tasks (Bandura, 1978; Litalien & Guay, 2015). Similarly, various scholars have argued that students' perception of their ability to succeed in achieving the requirements of a degree programme can explain differences in student success, regardless of the education level (Litalien & Guay, 2015; Nilsen, 2009). In particular, Litalien and Guay (2015) find that PhD students' confidence in their academic capacity is a predictor of completers and non-completers. It is helpful when PhD students understand and have confidence in their writing and research capacities, which reduces the frequency and length of self-doubt episodes (Lindsay, 2015). Many PhD students report experiencing a certain level of uncertainty about their capacities; when this self-doubt is persistent, students may end up self-sabotaging and procrastinating or not attempting tasks for fear of failure (Wao & Onwuegbuzie, 2011). However, Nilsen (2009) notes that faculty and university management can employ strategies to improve the self-efficacy, motivation and expectancy–value of their PhD students.

This study therefore seeks to answer the following research questions:

To what extent do motivation and self-efficacy factors influence PhD students' success in Kenyan universities?

To what extent does the relationship of motivation and self-efficacy with PhD students' success differ across background and programme characteristics in Kenyan universities?

2. METHOD

2.1 Design and data collection

We administered a cross-sectional student survey through an online questionnaire (Sosci Survey online tool). The target population was PhD students admitted in universities in Kenya between 2010 and 2018. To this end, we utilised a database of PhD students provided by some of the universities. We also contacted PhD students from universities who had not made

a PhD students' database available, through their graduate school coordinators. We contacted participants by phone and, after introducing the study, asked them to provide or confirm their email addresses to receive the link to the online questionnaire. A total of 1,354 PhD students provided valid email addresses. After emailing the questionnaire, we sent weekly email reminders and made two follow-up calls. Consent to participate in the study was sought from all participants and the study proposal was approved by the National Council for Science and Technology Kenya. Of the 1,354 PhD students who received the questionnaire, 21 declined to participate, and 840 attempted to complete the questionnaire. Ultimately, 628 respondents fully filled out the questionnaire. Seven of the completed questionnaires were excluded because they did not meet the study inclusion criteria (studied in universities outside Kenya, enrolled after December 2018, were outliers). We sought and got permission to undertake this research from the National Commission for Science, Technology and Innovation (NACOSTI) in Kenya and respondents were given the option to consent/decline their participation in the survey.

Variables

2.2.1 Motivation

To measure motivation, we used an eight-item scale adopted from the Motivated Strategies for Learning Questionnaire developed by Pintrich and Groot (1990) and explained by Pintrich, Smith and McKeachie (1991). This scale was designed to measure college students' motivational orientations and use of study strategies; therefore, we changed the questionnaire to be applicable to PhD students. For example, we adapted the original question "In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn" to "I chose a challenging research topic so that I can learn new things". We used a five-point Likert scale (1 = "strongly disagree", 2 = "disagree", 3 = "neutral", 4 = "agree" and 5 = "strongly agree"). After factor analysis and principal component analysis with Varimax rotation, we split the eight-item motivation scale into two four-item scales measuring intrinsic and extrinsic motivation. The reliability tests resulted in Cronbach's alpha scores of .74 and .73 for the intrinsic and extrinsic motivations, respectively (see Table 1).

Table 1: Motivation

Items	**Rotated Factor Loadings**	
	Intrinsic Motivation α = .74	**Extrinsic Motivation α = .73**
I am/was doing my PhD to strengthen my research capabilities.	.73	
I chose a challenging research topic so that I can learn new things.	.82	
The most satisfying thing for me in this programme is/was trying to understand the content as thoroughly as possible	.78	
I prefer/preferred research tasks that I can/could learn from even if they do/did not guarantee a good score.	.66	
If possible I want/wanted to graduate faster than my friends.		.68
I want/wanted to graduate as soon as possible to get a new job/promotion.		.73
I want/wanted to earn this PhD so that I can/could show my abilities to my family and friends.		.83
I am/was doing my PhD to fit in my social and work cycles.		.74

Self-efficacy

We measured self-efficacy using the general self-efficacy scale developed by Chen, Gully and Eden (2001). This eight-item, five-point Likert-type (1= "strongly disagree", and 5 = "strongly agree") scale measures individual perceptions of the ability to perform in various situations. Factor analysis resulted in one factor and a reliability test of the self-efficacy scale resulted in a Cronbach's alpha coefficient of .90 (see Table 2).

Table 2: Self-Efficacy

	Factor Scores Self-Efficacy α =.90
I will/would be able to achieve most of the goals that I have set for myself.	.681
When facing difficult tasks, I am/was certain that I will accomplish them.	.764
In general, I think/thought that I can obtain outcomes that are important to me.	.754
I believe/believed I can/could succeed at most endeavours to which I set my mind.	.822
I will/would be able to successfully overcome many challenges.	.828
I am/was confident that I can perform effectively on many different tasks.	.827
Compared to other people, I can/could do most tasks very well.	.716
Even when things are tough, I can/could perform quite well.	.757

Students' success

We operationalised students' success as being on track or delayed (Matheka *et al.*, 2020), measured with a pace variable that indicates the time needed to graduate; 48 months (36 months plus one-year extension) is the official PhD programme duration. We classified students who took 48 months or less as being on track, those who took between 49 and 60 months as being delayed one year and so on. We calculated the pace variable for continuing students by comparing *duration in the system* (i.e., from students' start date to a cut-off point at 31 December 2018) and the *equivalent programme year* based on output produced to date. We classified the pace variable into four categories (on track, delayed one year, delayed two years and delayed three or more years). A student with recorded output of *undertaking coursework* and a duration in the system of 36 months would thus still be in the first year of the programme, indicating being delayed for one year. To calculate the PhD students' pace variable, complete information about the student's success variable was required. However, not all respondents provided this data, such that we could only calculate the pace variable for 621 respondents, as presented in Table 3.

Table 3: Students' pace

	N	**%**
On track	118	19.0
Delayed one year	83	13.4
Delayed two years	237	38.2
Delayed three or more years	183	29.5
Total	621	100.0

Background characteristics

Table 4 contains descriptive characteristics, including age category, gender, financial support, mode of study, employment status and programme cluster. The number of respondents varies from one variable to the other because some respondents opted out of some questions and others did not complete the questionnaire.

Table 4: Students' characteristics

Variable	N	%
Age		
40 years and younger	219	26.5
41–50 years of age	339	41.0
51 years and older	268	32.4
Gender		
Male	498	60.1
Female	331	39.9
Financial support		
Self-sponsored	628	79.9
Partial scholarship	111	14.1
Full scholarship	47	6.0
Mode of study		
Full time	333	40.9
Part time	482	59.1
Employment status		
Fully employed	680	83.3
Part-time or self-employed	97	11.9
Unemployed	39	4.8
Programme cluster		
Social Sciences and Humanities	358	44.4
Business and Economics	188	23.3
Physical and Life Sciences	43	5.3
Applied Sciences	122	15.1
Medical Sciences	96	11.9

3. RESULTS

3.1 Introduction

To address the extent to which motivation and self-efficacy factors influence PhD students' success in Kenyan universities, we undertook multiple linear regression starting with the core model predictor variables (self-efficacy, intrinsic and extrinsic motivation) and students' pace as the dependent variable (model 1). For models 2–6, we included one background or programme variable at a time. If the new variable significantly explained the variance in PhD students' pace, we retained it in the subsequent models; otherwise, we omitted it.

We also explore the extent to which the relationship of motivation and self-efficacy with PhD students' success differs across background and programme characteristics. We thus undertook a multiple linear regression with the core model variables (self-efficacy and intrinsic and extrinsic motivation as predictor variables, PhD students' pace as the dependent

variable) on split data sets based on age groups, mode of study, financial support groups and programme clusters.

Do motivation and self-efficacy factors influence PhD students' success in Kenyan universities?

The multiple regression analysis (Table 5) showed that intrinsic motivation is not a significant predictor of students' pace. Students with higher intrinsic motivation exhibited no significant difference in pace from those with lower intrinsic motivation. In addition, PhD students' extrinsic motivation had no predictive value regarding students' pace, and those with higher levels of self-efficacy did not show significant differences in progress from those who had lower self-efficacy.

In terms of background characteristics, PhD students' age was a significant predictor of their pace: Older PhD students were significantly slower than their younger counterparts. We observed no difference between male and female students' pace, and financially supported students did not progress faster or slower than self-financed students.

Regarding programme characteristics, we observed no significant differences in students' pace based on their mode of study. However, programme clusters significantly predicted their pace.

Table 5: Multiple regression of predictor, programme and background variables on PhD students' pace

Predictor Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	3.58 (.42)	1.68 (.48)	1.69 (.50)	1.77 (.48)	1.52 (.50)	1.84 (.48)
Intrinsic motivation	−.13 (.09)	−.09 (.08)	−.09 (.08)	− .09 (.08)	− .09 (.08)	− .07 (.08)
Extrinsic motivation	.01 (.05)	−.02 (.05)	− .02 (.05)	− .01 (.05)	− .02 (.05)	−.02 (.05)
Self-efficacy	−.07 (.10)	−.07 (.10)	−.07 (.11)	−.06 (.10)	−.06 (.10)	−.04 (.10)
Students' age		.04** (.01)	04** (.01)	04** (.01)	04** (.01)	04** (.01)
Gender			−.03 (.09)			
Financial support				−.15 (.08)		
Mode of study					.10 (.09)	
Social Sciences and Humanities						Ref.
Business and Economics						− .26**(.11)
Physical and Life Sciences						− .34* (.19)
Applied Sciences						− .46** (.13)
Medical Sciences						−.17 (.14)
R^2	.01	.095	.095	.098	.096	.116

*Significant at .05 level. **Significant at .01 level.
Notes: A negative coefficient indicates a positive effect on students' pace.

Students' pace in Applied Sciences, Physical and Life Sciences and Business and Economics differed significantly from those in Humanities and Social Sciences. In contrast, students' pace in the Medical Sciences cluster did not significantly differ from those in the Humanities and Social Sciences cluster. To further specify differences in students' pace across

programme clusters, we cross-tabulated students' pace with the programme cluster variable. The Applied Sciences programme cluster had the largest proportion of students on track at 29.5%, closely followed by Physical and Life Sciences, with 28.6% on track, and Medical Sciences, with 20.5% on track. Humanities and Social Sciences had the lowest proportion of students on track at only 14.2%, and the Business and Economics programme cluster had 18.5% on track (Table 6).

Table 6: Students on track by programme cluster

	Programme Cluster				
	Humanities and Social Sciences	**Business and Economics**	**Physical and Life Sciences**	**Applied Sciences**	**Medical Sciences**
Students on track	14.2%	18.5%	28.6%	29.5%	20.5%

Does the relationship between motivation, self-efficacy and PhD students' success differ across background and programme characteristics?

We conducted further analyses to determine whether the core model pattern (in which the three core predictor variables were included with students' pace as the dependent variable) differed across age groups, mode of study, financial support groups and programme clusters. Table 7 shows that intrinsic motivation was a significant positive predictor of students' pace for PhD students in the Medical Sciences cluster but had no effect for the students in the other clusters. Similarly, self-efficacy was a significant predictor of students' pace only in the Medical Sciences programme, though this relationship was inverse. Extrinsic motivation showed no significant prediction of PhD students' pace in any of the five programme clusters.

Table 7: Multiple Linear Regression of Predictor Variables on PhD Students' Pace by Programme Cluster

	Variables	**Humanities and Social Sciences**	**Business and Economics**	**Physical and Life Sciences**	**Applied Sciences**	**Medical Sciences**
Model 1	Constant	3.9 (.610)	2.95(.81)	.05 (2.17)	2.55 (1.37)	2.82 (1.02)
	Intrinsic motivation	−.04 (.13)	.18 (.17)	.55 (.41)	−.33 (.25)	−.64 (.24)**
	Extrinsic motivation	.06 (.08)	−.01 (.09)	−.08 (.23)	.03 (.15)	−.08 (.12)
	Self-efficacy	−.22 (.17)	−.24 (.18)	.08 (.45)	.27 (.30)	.69 (.30)*

**Significant at .01 level.
Notes: A negative coefficient indicates a positive effect on the students' pace.

Self-efficacy and extrinsic motivation showed no significant predictive capacity relative to students' pace among the three age categories (see Table 8). Among PhD students aged 51 years and above, intrinsic motivation was a positive significant predictor of PhD students' pace.

Table 8: Multiple linear regression of predictor variables on PhD students' pace by age category

	Variables	40 Years and Below	41 to 50 Years Old	51 Years and Above
Model 1	Constant	3.17(.83)	3.06 (.65)	3.92 (.64)
	Intrinsic Motivation	−.00(.17)	.00(.13)	−.36 (.16)*
	Extrinsic Motivation	−.15 (.09)	−.02(.08)	.11 (.08)
	Self-Efficacy	−.11(.18)	−.04 (.17)	.07(.18)

*Significant at .05 level.
Notes: A negative coefficient indicates a positive effect on students' pace.

The core predictor variables and students' pace patterns did not significantly vary between part-time and full-time PhD students. Similarly, we observed no significant differences in how self-efficacy and intrinsic and extrinsic motivation predicted PhD students' pace among financially supported versus self-supported PhD students.

4. DISCUSSION AND CONCLUSION

Previous research shows that PhD students' success rate is rather low in Kenya (Matheka *et al.*, 2020). In this study, we observed that only 19% of the PhD students were on track with their programme. With this investigation of whether motivational factors, background and programme characteristics relate to PhD students' progress, we find, in contrast with other research (Kyvik & Olsen, 2014; Wao & Onwuegbuzie, 2011; Zhou, 2015), no evidence that intrinsic or extrinsic motivation affects PhD students' pace in Kenyan universities. These findings are in line with results reported by Litalien and Guay (2015), who note that completers and non-completers do not vary in their level of autonomous regulation (intrinsic, integrated and identified motivation) and controlled regulation (introjected and external motivation). However, looking more closely at programme clusters, we find that PhD students in Medical Sciences exhibit a significant relationship between intrinsic motivation and students' pace. This result could signal that medical sciences courses are particularly challenging. In order to handle such challenges at a PhD level, students would require great internal motivation, leading to the greater variance in students' pace across their levels of intrinsic motivation.

Although previous studies have shown that self-efficacy is positively correlated with PhD success (Litalien & Guay, 2015; Nilsen, 2009), we do not find such a significant relationship. This finding could be explained by the self-efficacy scores in this study, which are positively skewed, with a mean score of 4 on a 1−5 scale and a standard deviation of .524. McBrayer *et al.* (2018) record similarly high self-efficacy scores among doctoral students and also do not find a correlation between self-efficacy and time to degree or progression. The Medical Science cluster was an exception, indicating a significant negative effect of self-efficacy on PhD students' pace. A possible explanation is that the high scores of self-efficacy may hint at overconfidence. The PhD students in medical sciences have usually gone through demanding bachelors' and masters' programmes. Another possible explanation is that PhD students in this area are extremely busy in their professional career, because so few medical practitioners are available in Kenya, even at bachelors' level, which could lead to slow student pace despite high self-efficacy scores.

Students' age significantly predicts their pace. Younger PhD students move faster than their older counterparts. Other studies report similar results (Groenvynck *et al.*, 2013;

Johnson-Motoyama *et al.*, 2014). As people age, they acquire more responsibilities and family obligations; thus, older PhD students likely experience more severe time and resource constraints, which can require them to split their time and resources to cover family, social and employment obligations, in addition to their studies. The finding that younger PhD students (under 40 years) receive significantly more financial support also could explain their faster pace, because financial constraints can influence PhD students' progress and success (Bair & Haworth, 2004; Groen *et al.*, 2008; Jiranek, 2010; Khozaei *et al.*, 2015; Mohamed *et al.*, 2012).

Applied Sciences PhD students achieved the fastest pace, followed by those in Physical and Life Sciences, Business and Economics, Medical Sciences and Humanities and Social Sciences. The challenges in persistence and completion rates in humanities and social sciences have been reported in other regions (Canadian Association for Graduate Studies, 2004; Groenvynck *et al.*, 2013; Herman 2011). Some scholars attribute the slower pace in the humanities and social sciences to inadequate financial support, and we observed a similar trend in this study

Gender, financial support and mode of study were not significant predictors of students' pace. Only 6% of the PhD students had a full scholarship grant compared with almost 80% who were self-financed. We observed significant differences in financial support across the five clusters. The Humanities and Social Sciences and Business and Economic programmes featured the lowest proportions of financially supported PhD students; the Physical and Life Sciences and Applied Sciences programme clusters had the highest proportions.

We observed some significant differences between our results and those reported previously in studies conducted mainly in the United States, Europe or Australasia. These differences might reflect the variations in country-level PhD programmes and funding. Almost 80% of the Kenyan students we surveyed were self-financed, and more than 80% were fully employed, so we anticipate that aspects other than motivation likely have an important role in explaining Kenyan PhD students' success.

We acknowledge a few limitations of this study. First, we used only self-reports. Second, not all respondents indicated their position on the timeline of the PhD trajectory. To gain further insight into factors that affect PhD success in Kenya, we recommend that researchers follow a cohort of students longitudinally and explore how different factors positively or negatively influence success at various points along the trajectory.

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